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## Less Tillage for More Water in 2013

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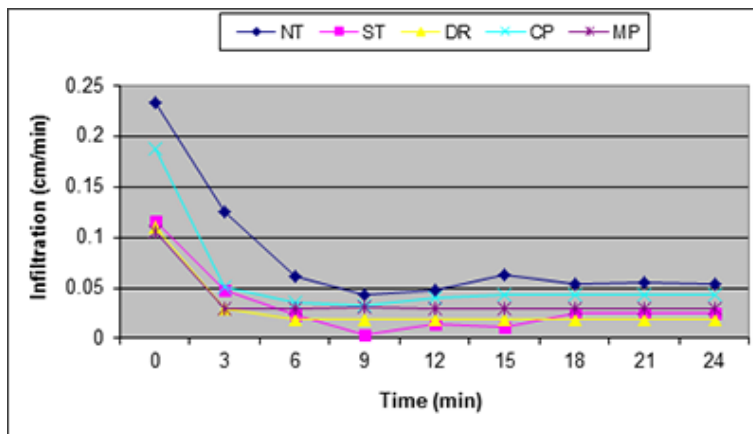
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## Less Tillage for More Water in 2013

By Mark Licht, ISU Extension and Outreach and Mahdi Al-Kaisi,  
Department of Agronomy

This was a summer of water deficit. With the current weather pattern trends, there is concern on what soil moisture reserves will be for the 2013 crop. One thing that can be done to replenish and manage soil moisture reserves is to reduce tillage.

Tillage reduces water infiltration by breaking large pores, and the small pores are clogged by the dislocation of soil particles. When there is no surface residue, raindrops break the soil aggregates, which clog soil pores leading to slow water infiltration and increase in surface runoff. Additionally, subsequent rains result in more runoff because of potential soil crusting. Research has shown a significant decrease in water infiltration rate as the intensity of tillage increased as shown in this figure.



**Figure 1. Water infiltration with five different tillage systems. NT=No-till, ST=Strip-tillage, DR=Deep Rip, CP=Chisel Plow and MP=Moldboard Plow. (Al-Kaisi, 2011). Note that strip-tillage infiltration rates were taken in the tilled zone.**

Incorporation of residue can cause a significant loss of soil moisture. Every tillage pass can cause the loss of approximately 0.25 inch of plant available water. Crop residue moderates soil temperature leading to a reduction in soil moisture evaporation, especially at the top 1-2 inches. Residue also reduces the amount of wind at the soil surface and, subsequently, reduces soil moisture evaporation.

Under the dry conditions this season, soil compaction due to equipment traffic was minimal. There is no reason to allocate time and fuel for deep tillage. While tillage may temporarily help reduce compaction in the tillage zone, it is not necessary because shallow compaction can be alleviated with normal freeze/thaw cycles.

Tillage reduces the quantity and quality of corn stalks that can trap snow. Leaving standing corn residue can help catch snow that would otherwise blow across the surface and be deposited elsewhere. Eight to 16 inch corn stalks hold more snow than bare soil. Additionally, the corn residue will reduce runoff and increase infiltration of snow melt in the spring. By some accounts this could equal 1 to 2 inches of soil moisture.

Goss's Wilt was not a concern in 2012. Yes, it is true that it survives the winter on the corn residue, but because there was minimal presence this year, there is no need for tillage this fall to further reduce risk in 2013.

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